1.1 PURPOSE

This document is intended to provide a clear set of functional and technical requirements for the procurement of a portable, ISO 14644 Class 7 (Class 10,000) clean room to be located in an ISO 14644 Class 8 (Class 100,000) high bay.

1.2 SCOPE

This specification describes the minimum requirements for the portable ISO 14644 Class 7 (Class 10,000) clean room to support critical space flight item processing.

1.3 REFERENCE DOCUMENTS

ASTM E2217-02	Standard Practice for Design and Construction of Aerospace Clean Rooms and Contamination Controlled Areas
FED-STD-209E	Airborne Particulate Cleanliness Classes in Cleanrooms and Clean Zones
FED-STD-595	Colors Used in Government Procurement
IEST STD-CC1246D	Product Cleanliness Levels and Contamination Control Program
ISO 14644-4	Cleanrooms and Associated Controlled Environments – Part 4: Design, construction and start-up

2.0 GENERAL REQUIREMENTS

- Clean room shall conform to ISO 14644-4.

Structural Requirements:

- Structurally sound and stabile for Seismic Zone 4.
  - Factor of safety to exceed 3.0.
  - Primary structural materials shall exhibit ductile failure mode.
    - Ductile materials are defined as materials with a failure strain in excess of 20%.
- Non-permanent structure that can be easily disassembled for movement/storage.
  - If wheels are provided, they must be:
    - Heavy-duty, locking casters.
    - Have sealed bearings or greased with low-to-no outgassing lubricant (clean room friendly).
    - Provided with a lubricant Material Safety Data Sheet (MSDS).
- Interior length: 24 feet.
- Interior width: 16 feet, with a modular 6 foot extension (to 22 feet total).
- Interior height: 16 feet.
- Minimum of one removable or roll-up opening providing access of at least 8’ wide and 14’ high.
- Top access to facility crane providing a minimum access area of a 3 foot x 3 foot square.
  - Ceiling-less solutions are preferred within budget constraints.
- Structural members/frame shall be finished with powder coating or Sherwin Williams Tile-Clad® Epoxy (or a NASA approved finish).
- All painted surfaces shall be white per FED-STD-595, color chip 17875 or 27875.

Clean Room Requirements:

- ISO 14644 Class 6 (Class 1,000) at rest and ISO 14644 Class 7 (Class 10,000) operational.
- Laminar, unidirectional Flow velocity at 90 ft/min (±30 ft/min), complete coverage.
- Maintain clean room at positive air pressure, 0.1 psig, relative to ambient environment.
- Soft walls comprised of clear Polysim or Polystat.
- No silicones materials to be used.
- Total hydrocarbons for the empty, at rest, room shall not exceed 15 ppm, methane equivalent when measured by a Flame or Photo Ionization Detector (FID or PID). The hydrocarbon deposition on an aluminum foil, or equivalent, substrate shall not exceed 0.2 mg/ft^2 per month.
- Provide perimeter access for electrical cabling and air conditioning ducting/hoses (for example, opening in the soft wall siding up to 6 in. from floor or periodic cable pass-throughs).
- Impart no impact to facility HVAC temperature and humidity capability.
- Operating decibel level shall not exceed 65db.

Filtration Requirements:

- Testing of Filters should be done using polystyrene, no DOP testing.
- HEPA or ULPA filters
    - A sample of the PSL solution must be tested by NASA Materials Engineer prior to use by HEPA manufacturer.
- Non-volatile residue (NVR) less than 0.5 mg/sq. ft/month per IEST STD-CC1246D.
- Hydrocarbon filters sufficient for less than 155 ppm/month.
- Fallout designed to less than 300 per month.
- Particle count designed to less than 3000 particles/ft^3.

Lighting Requirements:

- Provide shadowless, uniform incident lighting of 1,000 lumens (100 ft-candles, 30 meter-candles) per square meter within clean room.
- Overhead recessed fluorescent lighting, type T-8, with electronic ballast.
- 120 VAC/60Hz power

Electrical Requirements:

- All fan filter units shall be controlled by a single switch.
    - Switch to be light-indicated and of a button variety.
- All light units shall be controlled by a single switch.
- A sample of the PSL solution must be tested by NASA Materials Engineer prior to use by HEPA manufacturer.
- The clean room shall be powered by a single plug.
    - NEMA L5-20 is preferred.
    - NEMA L21-30 is acceptable if power requirements exceed NEMA L5-20.

Certification Requirements:

- Manufacturer to provide certification of clean room requirements once installed at final destination.